REMARKS

I. Status of the Claims

Prior to this amendment, claims 36 and 38-44 were pending. By the above amendment, claim 41 is cancelled, and claims 36, 38-40 and 42 are amended. Thus, claims 36, 38-40 and 42-44 are pending an under consideration on the merits.

Claim 36 has been amended to incorporate the limitations of previous claim 41. That is, claim 36 has been amended to recite, *inter alia*, a pair of core metal plates. Claims 38-40 and 42 have been amended to correct minor grammatical issues and to maintain antecedent basis with independent claim 36. Support for these amendments may be found, for example, at page 13 lines 18-23 of the as-filed specification. Accordingly, the above amendments raise no issue of new matter.

Claims 36 and 38-44 are rejected under 35 U.S.C. §103(a) as being unpatentable over Japanese Patent Application Publication No. JP 09-165681 ("Sagusa") in view of U.S. Patent No. 5,800,618 ("Niori"). Office Action, page 2. Applicants respectfully disagree with and traverse this rejection for at least the following reasons.

II. Summary of January 5, 2007 Interview

Applicants thank the Examiner for the Interview with Applicants' representatives on January 5, 2007. During this interview, Applicants' representatives explained several distinctions between the references cited in the outstanding Office Action and the claimed invention. In particular, Applicants' representatives explained the physical differences between cast metals (as claimed) and rolled metals (as used in Sagusa). Applicants' representatives also explained that the text of Sagusa clearly teaches away from the use of cast metal materials in a heating element.

Further, Applicants' representatives noted that even if, *arguendo*, rolled metals are considered to be equivalent to the claimed base metal, the applied §103 rejection is improper for at least two reasons. First, Applicants representatives' explained that Sagusa and Niori, either alone or in combination, fail to teach or suggest each and every element of the claims. Second, Applicants' representatives explained that one of ordinary skill in the art at the time the invention was made would not have been motivated to incorporate Niori's stainless steel plate into Sagusa's heating element (which comprises a sheath heater embedded in an aluminum ceramic complex) so as to arrive at the claimed invention.

Although the Examiner appeared to be somewhat swayed by the arguments during the interview, no agreement as to the patentability of the claims was reached. The Examiner advised Applicants' representatives to submit the arguments made during the interview in a Response for further consideration. Applicants' representatives indicated that they would take the Examiner's recommendation under advisement.

III. Arguments

Claims 36 and 38-44 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Sagusa in view of Niori. Office Action at 2-6. Insofar as the Examiner's reasoning applies to claim 41 it is moot, as claim 41 is cancelled herein. With respect to pending claims 36, 39, 40 and 42-44, Applicants respectfully disagree with and traverse this rejection for at least the following reasons.

To establish a prima facie case of obviousness, the Examiner must show that three basic criteria have been met. *See* M.P.E.P. § 2143. Specifically, the Examiner must establish: (1) that the prior art teaches or suggests each and every elements of a

claim; (2) that there is some teaching or suggestion in the prior art that would motivate one of ordinary skill in the art at the time the invention was made to make a proposed modification; and (3) that one of ordinary skill in the art would have had a reasonable expectation of success in making the asserted modification. *Id.* As discussed below, Applicants respectfully submit that the Examiner has not established any of these three criteria.

a. The prior art does not teach or suggest each and every element of the claims

Present claim 36 recites,

> "[a]n electrode comprising: a base metal formed of a cast metal; a heater embedded in the base metal and arranged on a plane; and a pair of core metal plates embedded in the base metal and arranged substantially parallel to the plane and adjacent to the heater, the core metal plates being arranged above and below the heater, respectively; wherein the heater and the core metal plates are cast in the base metal such that the core metal plates are entirely surrounded by the base metal and are entirely in metal-to-metal contact with the base metal; wherein a material forming the core metal plates has a rigidity higher than that of a material forming the base metal; and each of the core metal plates has a plurality of through holes, which are filled with the base metal so that the base metal above the respective core metal plates and the base metal below the respective core metal plates are bound together via the base metal filled in the through holes."

Claim 36.

As discussed below, Sagusa and Niori, alone or in combination, fail, at a minimum, to teach an electrode comprising a base metal formed of a cast metal, a heater embedded in the base metal, and a pair of core metal plates embedded in the base metal such that they are entirely surrounded by the base metal, arranged above

and below the heater, respectfully, and substantially parallel to the plane and adjacent the heater, as claimed.[1]

Sagusa discloses a heater plate for the heating of a substrate within vacuum devices. Sagusa, paragraph [001].[2] This heater plate comprises a plate 12 having a sheath heater 11 embedded therein, wherein aluminum *rolled* stock 13 covers the entirety of the plate 12. *Id.* at paragraph [0011] and FIG. 1 (emphasis added). Plate 12 is formed via forging, in which pre-manufactured plate of the aluminum cordierite complex 12' is provided, sheath heaters 11 are provided on the plate 12', aluminum cordierite powder sufficient to cover sheath heaters 11 is provided, and the entire structure is bonded through the application of heat and pressure. *Id.* at paragraph [0013] and FIG. 2.

Sagusa does not, however, teach a pair of core metal plates embedded in the base metal formed from a *cast* metal, as claimed. *See, e.g.,* claim 36. Although Sagusa mentions heaters employing cast aluminum, the reference does so in a discussion of the prior art. *See* Sagusa, paragraph [0005]. Further, Sagusa discloses that prior art heaters employing cast aluminum exhibit various problems, such as susceptibility to oxidation, out-gassing, surface roughness, moisture absorption, and breakage. *Id.* at [0006]. To overcome these problems, Sagusa utilizes a *rolled* aluminum stock to cover the disclosed heater plate. *Id.* at [0007]-[0008]. Thus, if anything Sagusa teaches away from the use of cast metals. *See, e.g., In re Gurley*, 27

[1] As used in the present claims, "base metal formed of a cast metal" means that the base metal is a metal formed by a casting process. *See* specification, page 8.

[2] All references to Sagusa refer to the machine translation of the reference provided by the Examiner with a prior Office Action.

F.3d 551, 31 U.S.P.Q.2d 1130 (Fed. Cir. 1994) (holding that "a reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant"). Moreover, given Sagusa's expressed distinction between cast metals and rolled metals, Applicant's respectfully submit that the Examiner's assertion that Sagusa's rolled aluminum plates are equivalent to the claimed the base metal formed of a cast metal is improper. *See* Office Action, page 2.

Sagusa also fails to teach embedding a pair of core metal plates in a base metal form of a cast metal, such that the core metal plates are entirely surrounded by the base metal, arranged above and below a heater, respectfully, and substantially parallel to the plane and adjacent the heater, as claimed. *See* claim 36. Indeed, Sagusa is completely silent with respect to embedding a metal plate within a cast base metal, much less embedding two of such plates in the location and orientation specified by the claims.

Niori does not cure the deficiencies of Sagusa. Niori discloses a heater equipped plasma generation unit. Niori, column 14, lines 47-55. This plasma generation unit incorporates a resistance heat generating body made of a high melting point metal, e.g., W or Mo, embedded in a ceramic substrate. *See Id.* column 14, lines 45-55 and FIGS. 4, 7 and 10.

Applicants acknowledge the Examiner's assertion that element 47 of Niori is a stainless steel electrode/core metal plate. Office Action, page 2. Applicants respectfully submit, however, that the Examiner's assertion in this regard is mistaken. Element 47

of Niori is a metal mesh electrode formed from molybdenum or possibly tungsten, not stainless steel. *See* Niori, column 17, lines 10-22 and column 18, lines 60-67. Indeed, Niori only mentions the use of stainless steel as a *covering plate* for a *prior art* heater element, not as an electrode, and certainly not as an embedded electrode as asserted by the Examiner. Indeed, Niori is completely silent with respect to embedding any additional elements besides a single mesh electrode in the disclosed plasma generation unit, much less embedding a pair of core plates above and below a heater, as claimed. Further, Niori is silent with respect to the use of a base metal formed from a cast metal, as claimed.

Therefore Sagusa and Niori, alone or in combination, fail to teach or suggest each and every element of claims 36, 39, 40 and 42-44. Thus, the §103(a) rejection of these claims as unpatentable over Sagusa in view of Niori is improper, and should be withdrawn.

ii. There is no motivation to make the proposed modification

Applicants further submit that there is no teaching or suggestion in either Sagusa or Niori that would have motivated one of ordinary skill in the art at the time the invention was made to modify Sagusa so as to arrive at the claimed invention. Three primary points support this assertion.

First, as noted above both Sagusa and Niori fail to teach the use of cast metal materials in their disclosed inventions. Indeed, Sagusa expressly teaches away from the use of cast metals at paragraph [0006]. Thus, any modification of Sagusa to use cast metals would go directly against the express teachings of the reference. *See, e.g.,* M.P.E.P. §2145 and *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983) (indicating that it

is improper to combine references where the references teach away from their combination).

Second, despite the Examiner's assertions to the contrary, Sagusa and Niori are completely silent with respect to embedding any additional elements into their disclosed heaters, much less embedding two core plates of the type and configuration recited in the present claims. Certainly silence with respect to claimed elements cannot be considered to provide motivation to make a proposed modification. *See, e.g., In re Lee*, 277 F.3d 1338, 1342-44 (Fed. Cir. 2002) (discussing the importance of relying on objective evidence and making specific factual findings with respect to the motivation to combine references).

Finally, the Examiner's asserted motivation for the proposed modification, namely to provide "a heated ceramic electrode that is durable as taught by Sagusa... and Niori... and to prevent damages during plasma processing as taught by Niori[,]" has no basis. With respect to the durability of the electrode, nothing in either Sagusa or Niori teaches or suggests that a heater comprising a base metal having a heating element embedded therein (as taught by Sagusa) will be any less durable than a heater comprising a base metal having a heating element and a stainless steel plate embedded therein (as asserted by the Examiner). Moreover, the apparatus' of Sagusa and Niori function perfectly well for their intended purpose without the modification proposed by the Examiner. Therefore the Examiner's allegations that the proposed modification will result in increased durability appear to be based on nothing more than conjecture.

The Examiner's assertion that motivation to combine Sagusa and Niori comes from the fact that the heating element resulting from the combination will be less susceptible to damage during plasma processing is equally unfounded. Based on the Examiner's citations in the Office Action, it appears that the basis for this allegation is Niori's disclosure that prior art conventional heaters were covered with a stainless steel plate to prevent their exposure to corrosive gasses during plasma processing, thereby improving their resistance to damage. *See* Niori, column 1. Applicants respectfully point out, however, that the sheath heaters of Sagusa are *already embedded* in an aluminum cordierite ceramic material. Sagusa, paragraph [0011] (emphasis added). Thus, Sagusa's sheath heaters would not be exposed to corrosive gases during plasma processing, and thus would not be expected to exhibit the problems of the prior art discussed by Niori. Moreover, Sagusa and Niori are completely silent with respect to whether the addition of an embedded steel plate would improve the damage resistance of Sagusa's embedded heater elements. Thus, the Examiner's indication that the proposed modification would be expected to provide increased damage resistance during plasma processing, like the aforementioned allegations of increased durability, appears to be based on nothing more than conjecture.

For at least the foregoing reasons, one of ordinary skill in the art would not have been motivated to modify Sagusa in the manner asserted by the Examiner. Thus, the §103(a) of claims 36, 39, 40 and 42-44 as unpatentable over Sagusa in view of Niori is improper, and should be withdrawn.

IV. Conclusion

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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